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REVIEWS OF BOOKS

Grundzüge der Reproduktions-Psychologie. By BENNO ERDMANN. Berlin und Leipzig, Vereinigung Wissenschaftlicher Verleger, Walter De Gruyter & Co. 1920. Pp. viii, 186.

To those who are acquainted with Erdmann's contributions to psychological literature, as well as to those who have attended his lectures on psychology, the main argument of the *Grundzüge* will not be new. The book presents a careful restatement and logical completion of his scattered discussions of a fundamental psychological process. The original discussions appeared in his numerous papers on thought and language, in his logical studies, and in his *Theorie der Apperzeption*.

To those who believe in the essential soundness of his account of the reproductive processes in perception and in thought, this restatement will be a welcome and convenient document. But the book was written for those who are not familiar with his doctrine. It was obviously motivated by the desire to present a fundamental portion of his logical and psychological contributions in a form that would insure its permanence and a fair hearing. Erdmann makes very clear how much importance he attaches to it.

The book was obviously produced under difficulties. Controversial matter, originally planned for, was cut out bodily. The rest bears marks of condensation. The publisher is formally thanked for producing the book in spite of the "unfavorable times."

Notwithstanding its comparative brevity, the *Grundzüge* contains a careful presentation of the personal and historical conditions of its argument. A frank statement of epistemological and psychological postulates, defence of "arm-chair introspection," and a remarkable attempt to represent his underlying personal equation, are added to the more commonly expected acknowledgments to his teachers and associates, to his historical antecedents and to experimental data. The effort to give the reader all the information necessary for discounting the bias of the author, as well as for a critical estimate of the mental antecedents and personality behind the doctrine, is unparalleled in psychological literature.

If one sought the most fundamental principle of the *Grundzüge* it would probably be found in the doctrine of non-independent reproduction by apperceptive fusion. This is an immediate, necessary, and universal process in every perception, and consists of the arousal of certain representables and their fusion with the direct effects of stimulation. It should not be confounded with the associative fusion of sensory data into wholes possessing qualities, or with the associative interweaving of percepts by preestablished neural paths, by personal experience, or by similarity. It is the precondition of them all.

Any *Reproduktions-Psychologie* must start with the postulate of psychophysical residua. Their nature still remains a matter of debate. That they exist as unconscious dispositions to new moments of consciousness, that they retain as unconscious dispositions the associative interweaving of the original experience, there is abundant evidence in habit, both motor and perceptual, intellectual and emotional. The possibility of reproduction which is not conditioned by preformed paths or by experience; whether actual contents of consciousness are the exclusive conditions of reproduc-

tion; the possibility of reproduction which does not appear as conscious content; these, together with the function of attention in reproduction, are the main problems of the *Grundzüge*.

Sense-perception regularly involves memory-factors for which there is no direct sensory stimulus. These are commonly associated supplements. The consequent perception may be called associatively supplemented (*ergänzt*) perception. A still simpler and more fundamental supplemented perception is found in tachistoscopic experiment and occasionally in daily life. It occurs when attention is concentrated on the perceptual content, and also when objects are casually noticed in cases of diffused attention. In spite of the narrowness of this kind of perception, it is often clearer than the present stimuli can account for, and it commonly involves an identifying cognition. Either fact would imply the interaction of reproduced sensory experience. The notable peculiarity of such reproductions is that they never appear in consciousness independently, but always fused with the immediate results of stimulation. The term *apperceptive fusion*, which may be applied to such reproduction, must not be confounded with associative fusions of conscious factors. It refers not to conscious contents but to the conditions of consciousness. Apperceptive fusion involves two moments which may be called respectively the stimulus-component and the residual component. In any given fusion the two components are simultaneous. Dynamically, the stimulus-component is primary. The residual component, however, is responsible for the fusion.

Apperceptive fusion is the condition of all cognition. It determines the course of attention and is the cause of the illusions of normal and abnormal life. All cognition is recognition. No perception (even the most undeveloped) is entirely free from apperceptive fusion. In adult consciousness it underlies the serial development of observation, introspective as well as sensory.

The reproductive processes that begin in apperceptive fusion commonly lead to mediate supplemental interwoven reproductions. Of these, remembered, abstract, and imagined presentations are the simplest forms. Such reproduction is associative, but not in the sense of Hume's association of ideas. Only *residua* are associated with the immediately aroused component of apperceptive fusion through which they are reproduced. In mediate supplemental interwoven reproductions neither the associated *residua* nor the condition of their reproduction is a conscious content.

Of the various forms of supplemental interwoven reproduction the most momentous is the perception of symbols. The cognition of symbols presents every form of sensory cognition from apperceptive fusion to the more complicated thought-processes. In the discussion of these supplemental reproductive interweavings, Erdmann restates, partly in the form of equations, his contributions to the interrelation of thought and speech, as well as to the psychological organization that underlies formulated thought. The argument is too condensed for recapitulation.

Not only may reproducing moments be non-independently aroused *residua*, now fused with sensory moments, and again interwoven as associated supplemental moments, but also the products of reproduction may remain unconscious though stimulated. This occurs in apperceptive preparation for (or in attention to) a coming unknown stimulus, in the silent elaboration of speech, and, as Erdmann's self-observation indicates, in the lack of meaning-consciousness antecedent to familiar utterance. The understanding of sense impressions, of speech, and of reading matter may on occasion involve wide-spread conscious reproduction of agglutinated *residua*. When the material is sufficiently familiar, the stimulated agglutinated *residua* may remain unconscious. These unconsciously stimulated *residua* may be represented in consciousness by emotional states, of which the feeling of familiarity is an example.

The climax of apperceptive completion appears in the sublogical processes such as abstraction, comparison, expectation, and combination, which are the psychological foundation of formulated thinking both inductive and deductive.

Erdmann regards attention as a ground-function of the mental life. Whether it takes the form of clearness of the changing content of consciousness or the form of expectation, it involves a reproductive process which is determined by the connection of residua. In expectation that which is expected is commonly not given as an object of consciousness, though under favorable circumstances it may be. In the former case what is expected must be regarded as an excited representable, a kind of pre-consciousness.

It is always a dubious process to present discontinuous bits of a careful discussion for approval or disapproval. In the present instance it were worse than useless unless it induces the reader to explore for himself the original mine of fine observation and far-reaching analysis.

RAYMOND DODGE

Wesleyan University

The Origin and Development of the Nervous System from a Physiological Viewpoint. By C. M. CHILD. University of Chicago Press, Chicago, Illinois. 1921. Pp. xvii., 296.

In this book the origin and development of the nervous system are considered from a physiological point of view.

The first five chapters form an introduction to the primary thesis, and are devoted to a discussion of pattern in the organism and the possible relation of pattern to the physiological gradients in general.

Protoplasmic pattern and organismic pattern, in the author's opinion, differ probably only in the order of magnitude; and the question immediately arises whether organismic pattern (the relation of parts in the organism) is inherent in protoplasm, and develops spontaneously, or is, in some sense, a response to environment. The subject-matter of the book is concerned with an attempt to answer this question. Excluding the purely contactual or mechanical factor, there are two chief categories of relation between protoplasm and its environment, the material or chemical and the dynamic or excitatory; and the latter—the excitation-transmission relation—the author believes to be the important factor in impressing the organismic pattern on the protoplasmic substratum.

He discusses the physiological basis of various pattern-types in plants and animals, attaching great importance to the physiological gradients (quantitative gradations in functional activity) in pattern-production.

The nervous system, the organ of integration, in its origin and development, does not involve the appearance of a new functional activity different from the fundamental activities of protoplasm in general; some kind of physiological continuity exists between excitation and conduction in protoplasm generally, and the development of the nervous system. "Living protoplasm is functioning at all times and development is a process of functional construction, that is, beginning with a given structure and function, the continuance of function modifies the structural substratum, and this in turn modifies further function, and so on." According to this conception, the author believes that the nervous system is the physiological and morphological expression of the excitation-transmission relations, first with respect to the primary or chief physiological gradients, and later with respect to the progressive developmental complications as they arise.

The localization of the nervous system is an example of surface-interior pattern, and the general direction of growth and differentiation is down the physiological gradients, beginning at the anterior end and extending posteriorly.